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EXAMINER	
JARRETT, RYAN A	

ART UNIT	PAPER NUMBER
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,629	OPEM ET AL.	
	Examiner	Art Unit	
	RYAN A. JARRETT	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 September 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings were received on 09/10/09. These drawings are accepted.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3 and 5-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1-3 and 14-16 recite the limitation "single safety controller". There is no support in the original disclosure for this limitation. These limitations should be changed back to "single controller".

Claims 5-13 and 17-20 depend from claims 1 and 15 and incorporate the same deficiencies.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10-12 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10-12 depend from a cancelled claim.

Claim 14 recites the limitation "the redundant controller unit" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 5-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Andreas Schenk. "SIMATIC S7-400F/FH: Safety-Related Programmable Logic Controller". SAFECOMP 2000, LNCS 1943 (2000): 286-293.

Schenk discloses:

1. A method to increase a safety integrity level of a single safety controller for control of real world objects, the method comprising:

attaching to the single controller (e.g., Fig. 1: "1 standard CPU 417-4H") a safety-hardware unit (e.g., Fig. 1: "fail-safe I/O module") wherein the safety-hardware unit communicates with a central processing unit of the single controller,

connecting a bus (e.g., Fig. 1: "PROFIBUS") to the single safety controller (e.g., Fig. 1: "1 standard CPU") and connecting an input/output unit to the bus (e.g., Fig. 1, pg. 287: "Safety-related input from and output to the process are done with special *fail-safe I/O modules*"),

downloading safety-related configuration data and/or diagnostic information to the attached safety-hardware unit (e.g., pg. 288: "The fail-safe I/O modules are configured with the standard hardware configuration tool", pg. 287: "external fault diagnostics") and downloading a control function software to the single controller (e.g. Fig. 1, pg. 291: "not safety-related application program"),

configuring the attached safety-hardware unit to execute logic, which depends on the downloaded safety-related configuration data and/or diagnostic information (e.g., pg. 288: "The fail-safe I/O modules are configured with the standard hardware configuration tool", pg. 287: "The fail-safe I/O modules provide an internal 1oo2 structure with comparison, self-tests and external fault diagnostics"),

actively or passively setting output values of the single controller to a safe state for online safety control (e.g., Fig. 1, pg. 287: "Safety-related input from and output to the process are done with special *fail-safe I/O modules*"),

obtaining access to a plurality of input and output values of a real world object through the bus (e.g., Fig. 1, pg. 287: "Safety-related input from and output to the process are done with special *fail-safe I/O modules*"), and

verifying a validity of the bus communication with the attached safety hardware unit (e.g., pg. 290: "the checksums of the safety telegrams sent are invalid and fault detection and reaction is done by the recipients of safety telegrams, i.e., fail-safe output modules").

2. The method according to claim 1, wherein the single safety controller has the capability of executing a set of non-safety critical control functions, which set of non-safety critical control functions is the same before as well as after the safety hardware unit is attached (e.g. pg. 291: "Safety-related and not safety-related application program can be processed by the same CPU").

3. The method according to claim 2, wherein the configuring comprises:

downloading to the attached safety hardware unit diagnostic information, which previously was automatically generated by a software tool as a result of user's configuration of the single safety controller and which diagnostic information is used in the attached safety hardware unit during safety critical control (e.g., pg. 288: "The fail-safe I/O modules are configured with the standard hardware configuration tool", pg. 287: "external fault diagnostics").

5. The method according to claim 1, wherein the timing supervision of the controller is verified in the attached safety hardware unit (e.g., pg. 289: "Cycle time is checked…indirectly by the recipients of safety telegrams waiting for a new sequence number in the safety telegram").

6. The method according to claim 1, wherein correct sequence of code logic is verified in the attached safety hardware unit (e.g., pg. 289: "Cycle time is checked…indirectly by the recipients of safety telegrams waiting for a new sequence number in the safety telegram").

7. The method according to claim 1, wherein correctness of memory content of the controller is verified in the attached safety hardware unit (e.g., pg. 290: "Self-tests include SP7-ASIC, RAM and CRC of code blocks and operating system").

8. The method according to claim 1, wherein a download of new control functionality logic to the controller is verified in the attached safety hardware unit (e.g., pg. 290: "Self-tests include SP7-ASIC, RAM and CRC of code blocks and operating system").

9. The method according to claim 1, wherein the attached safety hardware unit performs checks in order to allow only users logged on as safety classified engineers and safety classified operators to modify the control functionality logic and parameters (e.g., pg. 290: "password").

10. The method according to claim 4, wherein the bus communication verification logic in the attached safety hardware unit is implemented diverse (e.g., pg. 290: "Comparison of the diverse results of the safety-related application program and fault reaction is done…indirectly by the recipients of the safety telegrams sent by the safety-related application program, i.e., fail-safe output modules").

11. The method according to claim 4, wherein the attached safety hardware unit is diverse generating a safety related header for the bus communication (e.g., pg. 290: "Comparison of the diverse results of the safety-related application program and fault reaction is done…indirectly by the recipients of the safety telegrams sent by the safety-related application

program, i.e., fail-safe output modules", "This safety protocol is…implemented in the fail-safe I/O modules").

12. The method according to claim 11, wherein the input/output unit has two diverse implementations each verifying the correctness of the bus traffic and each generating a safety related header for the bus communication (e.g., pg. 290: "Comparison of the diverse results of the safety-related application program and fault reaction is done…indirectly by the recipients of the safety telegrams sent by the safety-related application program, i.e., fail-safe output modules", pg. 287: "This safety protocol is…implemented in the fail-safe I/O modules").

13. The method according to claim 1, wherein the attached safety hardware unit comprises a first and a second module in a redundant configuration, the second module is updated with data that exists first module at the time of a failure and the second module takes over the safety related control of the control system from the first module if a failure of the first module is detected (e.g., Fig. 5: "redundant fail-safe I/O modules").

14. The method according to claim 13, wherein the redundant controller unit is attached to the single safety controller, which takes over in case of a failure of a primary controller and the redundant controller unit establish communication with either the active first module or the active second module of the attached safety hardware unit (e.g., Fig. 5: "redundant CPU 417-4H").

15. A single or 1-channel control system intended for safety-related control of real-world objects, comprising:

a single main central processing unit handling main processes of a single safety controller (e.g., Fig. 1: "1 standard CPU 417-4H"),

a safety-hardware unit (e.g., Fig. 1: "fail-safe I/O module") attached to said single safety controller (e.g., Fig. 1: "1 standard CPU 417-4H"), the safety-hardware unit comprising means to increase a safety-integrity level of the single safety controller and comprising means to set output values of the single safety controller in a safe state for online safety control (e.g., Fig. 1, pg. 287: "Safety-related input from and output to the process are done with special *fail-safe I/O modules*").

16. The control system according to claim 15, wherein the safety controller has the capability of executing a set of non-safety critical control functions, which set of non-safety critical control functions is the same before as well as after the safety hardware unit is attached (e.g. pg. 291: "Safety-related and not safety-related application program can be processed by the same CPU").

17. The control system according to claim 16, further comprising: means for downloading to the attached safety hardware unit diagnostic information, which previously was automatically generated by a software tool as a result of user's configuration of the controller and which diagnostic information is used in the attached safety hardware unit during safety critical control (e.g., pg. 288: "The fail-safe I/O modules are configured with the standard hardware configuration tool", pg. 287: "external fault diagnostics").

18. The control system according to claim 17, further comprising:

an input/output unit (e.g., Fig. 1, pg. 287: "Safety-related input from and output to the process are done with special *fail-safe I/O modules*") connected to the controller by a bus (e.g., Fig. 1: "PROFIBUS") and the validity of the bus communication is verified in the attached safety hardware unit (e.g., pg. 290: "the checksums of the safety telegrams sent are invalid and fault

detection and reaction is done by the recipients of safety telegrams, i.e., fail-safe output modules").

19. The control system according to claim 18, wherein the bus communication verification logic in the attached safety hardware unit is implemented diverse (e.g., pg. 290: "Comparison of the diverse results of the safety-related application program and fault reaction is done…indirectly by the recipients of the safety telegrams sent by the safety-related application program, i.e., fail-safe output modules").

20. The control system according to claim 19, wherein the attached safety hardware unit is diverse generating a safety related header for the bus communication (e.g., pg. 287: "This safety protocol is…implemented in the fail-safe I/O modules").

Response to Arguments

Applicant's arguments filed 09/10/09 have been fully considered but they are not persuasive. Applicant argues that Schenk does not disclose attaching a safety-hardware unit to a single controller. However, Schenk discloses attaching to a single controller (e.g., Fig. 1: "1 standard CPU 417-4H") a safety-hardware unit (e.g., Fig. 1: "fail-safe I/O module"). So, Fig. 1 of Schenk clearly depicts two separate physical units, not a single physical unit as argued by Applicant.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN A. JARRETT whose telephone number is (571)272-3742. The examiner can normally be reached on 10:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ryan A. Jarrett/
Primary Examiner, Art Unit 2121

11/06/09